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ABSTRACT

The project described in this report focused on the development of an interdisciplinary course incorporating physics and literature at Shoreline Community College. Part 1 provides an overview of the project and summarizes major questions and problems confronted in the process of curriculum development, including the relationship between science and the humanities and the need to redefine both in light of modern knowledge and research; the lack of guidelines, formats, and ready-made materials available to simplify the development of the course; the need to find materials that were accessible and comprehensible to the average freshman student; and the urgency of confronting the implications of post-Einsteinian science in terms of human consciousness and values, and human survival. Part 2 contains the course syllabus, including information on course objectives, format, reading selections, assignments, evaluation, and grading. Part 3 outlines the schedule for the 10-week course, during which topics such as the relationship of science and the humanities from the classical Greek period to the Einsteinian revolution and beyond; the relationships between science and religion and between literature and science; the effect of scientific revolutions on accepted world views; and the radical world of quantum physics and its implications are discussed. Topics, readings, and films are indicated for each week. Parts 4 and 5 provide bibliographies of books and films. (KL)

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ED221233

AN INTERDISCIPLINARY COURSE INVOLVING SCIENCE AND THE HUMANITIES

Robert W. Love
Frederick S. Olson

I. PROJECT OVERVIEW AND SUMMARY

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VC 820 367

Washington State Community College Humanities Project
Campus Project to Revitalize the Humanities

FINAL REPORT

An Interdisciplinary Course Involving Science & The Humanities
(Project Title)

Robert W. Love and Frederick S. Olson	Shoreline Community College
(Project Director)	(Community College)
15 June 1982	111-D12
(Completion Date)	(Budget)

1. Brief Description of Project

The project developed an interdisciplinary classroom course incorporating physics and literature. A course outline, working bibliography and film list is included.

2. Potential for Replicatility by Other Colleges

3. Contact Person for Information About Project

Robert W. Love & Frederick S. Olson	546-4783/546-4797
(Name)	(Phone)
	274-1783/274-1797
	(Scan)

(Mailing address assumed to be via the college)

4. Consultancy Skills Developed By Project
(Identify individuals and areas of expertise.)

None

5. Work Products Produced by Project
(Describe films, video tapes, course outlines, bibliographies, etc., and indicate availability and cost.)

See appropriate sections in the final report

6. Specific Outcomes of Project
(Relate to OBJECTIVES identified in proposal.)

Course Outline
Syllabus
Bibliography
Film List

7. Advice to Others Considering Similar Project

Keep objectives for an interdisciplinary course limited in scope.

8. Evaluation
(Describe evaluation plan and summarize results, citing in particular, significant achievements and failures, if appropriate.)

Course has not yet been offered, so an evaluation cannot be made at this time.

9. Contribution to Revitalization of Humanities
(Cite specific Humanities Project goals, if appropriate.)

10. Potential For and Likelihood of Assimilation Into On-going College Program

11. Comments

Tentative plans are to offer this course during Winter Quarter 1983.

This is to certify that the foregoing constitutes a fair and accurate report on the Project and that in the opinion of the Project Director and Campus Facilitator, the Project has been completed in full satisfaction of the terms and conditions contained in the Letter of Agreement.

R. W. Love
Project Director

Campus Facilitator

This is to certify that the Final Report has been reviewed and approved.

Humanities Project Coordinator

I-- PROJECT OVERVIEW AND SUMMARY

This project was conceived in the belief that science and the humanities are speaking the same truth, albeit at times with different accents. Indeed, we should seriously consider the possibility that what is popularly thought to be a fundamental difference between science and the humanities (or, more specifically, between physics and literature, which is our main concern), is really no more than a difference in tools and style. In the final analysis, scientists as a group are as much "humanists" as their colleagues laboring in fields commonly labeled the humanities. After all, the purpose of science is ultimately to enable man to understand nature's laws (or non-laws) so that he can gain some control over his life, enrich it and give it some meaning. How much more humanistic can any effort be? Of course, many scientists do not have such lofty ideals and goals; but then, many workers in the humanities do not either. Humanism is as humanism does, and it is found as often behind the microscope as behind the easel or on the stage. This is a basic assumption we have decided to accept.

Our research in preparing this course led us down several paths we had not even known to exist before we began the journey. Indeed, we found we were traveling in largely unexplored territory, not only in the interdisciplinary approach to science and the humanities, but also in the realm of contemporary (i.e. post-Einsteinian) scientific theory. To our amazement, we began to realize that what the non-scientific community (and perhaps much of the traditionally-educated

scientific community as well) thinks of as fundamental natural law (e.g. the orderly, predictable workings of a basically material universe) is usually the product of Classical and Newtonian physics, which has almost wholly been refuted, or at least seriously challenged, by the mainstream of contemporary research in nuclear physics. Not only are traditional truths being challenged but so also are conventional methods and processes. When the modern physicist says that it may not be possible to make an observation of an object without the observer in some way influencing the object, he is not more than a mental hair's breath away from those humanists who value individual feeling, opinion and judgement in matters of subjective experience.

Our task then, has been enlarged. Not only have we had to try to prove the benefits of looking at the scientific and humanistic worlds in a unified way, but we have also had to redefine what we commonly mean by the term "scientific". Ultimately, we may also have to redefine what we commonly mean by the term "humanistic", since ironically many humanists have, knowingly or unknowingly, adopted what they consider the "scientific" attitude and method of approaching the humanities - perhaps in an effort to add the "respectablity" of hard, objective and rational analysis to the study of the soft, spiritual and non-quantifiable humanistic subjects.

In trying to organize the content and material for this course, it became obvious that what we were ideally trying to accomplish required more time than that provided by a ten or eleven week academic quarter. For practical reasons,

however, we've chosen, for the time being, to work within this limitation even though, as a result, we can offer only an introduction to this boundless subject.

We also had to face the problem of all pioneers: the lack of guidelines, formats and ready-made materials. Very few educational institutions offer an introductory inter-disciplinary course of this kind (in fact, we know of only one in this area that is doing anything similar - Green River Community College - and they have a three-pronged program including the social sciences). Book publishers, therefore, apparently have little incentive to prepare specific textbooks for this purpose. At least we have found none. Our reading materials, of necessity, consist of a varied collection of individual books and self-prepared extracts.

The subject we are dealing with can be extremely profound and complex - if we allow it to be. We therefore had to set for ourselves a basic criterion in choosing reading material: no matter how esteemed the work or its author, if it would not be palatable and comprehensible to the average, reasonably motivated and capable college freshman, it was rejected in favor of another that was. In our judgment, the two books we chose to present scientific theory meet this student-oriented requirement very well. So also do all of the literary selections which, as to be expected, were also chosen by two additional criteria: how well they manifested the scientific attitudes of the three major historial periods (Classical Newtonian, Darwinian, and Einsteinian)and how well they would serve,collectively, to provide the student with an introduction to literature in all

its major genre, over a wide historical spectrum, and from a variety of national/cultural traditions.

Although we intend to provide an historical overview of the relationship between science and the humanities, we have decided to give priority to the contemporary scene. The developments in physics since the time of Einstein, especially in the area of nuclear physics, are so radical that the Classical-Newtonian-Cartesian world view that has shaped Western Civilization as we know it must now be seriously questioned. Since the ideology of the new physics has such profound implications for the humanities, for human consciousness and values and, indeed, for the future of the human race - and since so very few of us have any idea of what it all means - it should not be surprising if enlightened educators approach this matter with an air of urgency.

This course as we have conceived and prepared it is an initial effort in this direction. Needless to say, experience in the classroom will bring many changes in method and content. Already we can foresee the feasibility of enlarging the scope of the course to encompass other areas of the humanities besides literature, specifically art, music and drama, and, in so doing possibly expand the content into a two or three quarter sequence.

We anxiously invite ideas, criticism and help from those who can share with us our enthusiastic belief in what we are trying to do in this course. Hopefully, our colleagues at other institutions will find a way to join us in what promises to be a highly exciting educational adventure.

II-- COURSE SYLLABUS

I. OBJECTIVES

The purpose of this course is twofold: first, to introduce the student to the evolution of the philosophy of Western science from the time of Classical Greece to the present and to show how the prevailing scientific attitude has influenced the literature of the time and, more broadly, human behavior; second, to introduce the student to quality literature of various types (novel, short story, drama, poetry, essay) from different time periods and cultural traditions and to show how man has chosen, or been forced by his circumstances, to deal with the problem and question of his existence.

Our main emphasis will be on the contemporary period so that we can better understand ourselves in relation to our social and physical environment and wisely prepare the "brave new world" rapidly coming upon us.

II. PRESENTATION

Class will meet every day of the week and will generally conform to the following approximate schedule:

Monday:	Lecture on science topic
Tuesday:	Student-instructor discussion of science topic (both lecture and weekly reading assignment)
Wednesday:	Film or guest lecturer
Thursday:	Lecture on literature topic
Friday:	Student-instructor discussion of literature topic (both lecture and weekly reading assignment)

III. READING SELECTIONS

A. Required

Books: Wolf, Taking the Quantum Leap
Kearney, Science And Change 1500-1700

Novels: Wilder, The Bridge Of San Luis Rey
Camus, The Stranger
Vonnegut, Slaughterhouse-Five

Short Stories: Crane, "The Open Boat"
Durrenmatt, "The Tunnel"
Akutagawa, "Rashomon"
Forster, "The Machine Stops"

Drama: Shakespeare, Hamlet, Prince of Denmark

Poetry: Emerson, "Each And All"; "Rhodora"
Wordsworth, "Ode To Duty"
Bryant, "To A Waterfowl"
Whitman, "On The Beach At Night Alone"
Frost, "Desert Places"
Eliot, "The Hollow Men"
Yeats, "The Second Coming"
McLeish, "The End Of The World"
Ferlinghetti, "Dog"

Essays: Snow, "The Two Cultures"
Snow, "The Interplay Of Literature And Science"
Plato, "The Allegory Of The Cave"
Krutch, "The Tragic Fallacy"

B. Recommended

See attached bibliography

IV. ASSIGNMENTS AND EVALUATION

1) There will be a factual quiz at the end of the third and seventh weeks, an essay-type mid-term exam at the end of the fifth week, and a final essay-type exam at the end of the quarter.

2) A critical essay of 1,000-1,500 words on one of the following subjects will be due the beginning of the tenth week:

a) Compare the deterministic and probabalistic methods of problem solving; specifically,

IV. ASSIGNMENTS AND EVALUATION - Continued

describe two problems from your own experience (human, mechanical, philosophical, etc.) and explain why one is best solved by deterministic methods and why the other is best solved by probabalistic methods.

b) Analyze a novel you have read (other than one of our assigned selections) in terms of both the deterministic and probaballistic methods, concepts and attitudes that underlie its theme, plot, characterization and style.

V. GRADING

A. The final quarter grade will be determined on the basis of the following graded assignments:

Final Exam:	30%
Mid-Term Exam:	20%
Quizzes (both):	20%
Analytical Paper:	30%

B. The student has a choice of taking the regular letter grade (A-F) or the P/Y/F option, as described more fully in the College catalog. The instructor must be notified by the second week of the quarter if the P/Y/F option is preferred.

III--COURSE SCHEDULE

WEEK ONE

Topic: The inseparable Yin and Yang of science and the humanities: comparisons of processes and products.

Reading: Kearney, Chapter 1
"The Two Cultures"
"The Interplay Of Literature and Science"

Film: The Starry Messenger

WEEK TWO

Topic: Classical Greek values: roots of Western arts and science.

Reading: Kearney, Chapter 2
Hamlet, Prince of Denmark

Film: The Odyssey: Central Themes

WEEK THREE

Topic Science begins to scrutenize God

Reading: Kearney, Chapter 4 (to Kepler)
"The Allegory Of The Cave"
"The Tragic Fallacy"

Film: Rappaccine's Daughter

Quiz #1

WEEK FOUR

Topic: Literary aesthetics in the mechanically perfect universe of Newton and Descarte.

Reading: Kearney, Chapter 4 (from Kepler)
"The Rhodora:, "Each And All"
"To A Waterfowl"
"Ode To Duty"
"On The Beach At Night Alone"

Film: Paul's Case

COURSE SCHEDULE - Page 2

WEEK FIVE

Topic: God and Man in the aftermath of the Darwinian Explosion: The first crack in the Classical worldview

Reading: Kearney, Chapters 5, 6, 7 and 8
The Bridge of San Luis Rey

Film: Darwin and Evolution

MID-TERM EXAM

WEEK SIX

Topic: "The Einsteinian Revolution" The second crack in the Classical worldview

Reading: Wolf, Chapters 1 and 2
"The Open Boat"
"Rashomon"
"The Tunnel"

Film: The Majestic Clockwork

WEEK SEVEN

Topic: Indeterminism and absurdity in science and the arts

Reading: Wolf, Chapters 3,4 and 5
The Stranger

Film: Continuum: Special Theory Of Relativity

Quiz #2

WEEK EIGHT

Topic: The radical new world of Quantum Physics

Reading: Wolf, Chapter 8
"The Second Coming"
"The Hollow Men"
"The End Of The World"
"Desert Places"
"Dog"

Film: World Within World

WEEK NINE

Topic: Mind and Matter: The evolution of human consciousness

Reading: Wolf, Chapters 9, 10, 11 and 12
Slaughterhouse - Five

Film: Alternate Lifestyles in California: West Meets East

WEEK TEN

Topic: Implications for the Human Family, present and future.

Reading: Wolf, Chapters 13 and 14
"The Machine Stops"

Film: The Futurists

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* Presently not available in Shoreline Community College Library.

V--BIBLIOGRAPHY

FILMS

"Alternative Lifestyles in California: West Meets East." The Long Search Series 12, Time-Life, 1978.

"The spiritual impulse of the time steps beyond the boundaries of religious tradition." - so wrote Theordore Roszak, protagonist for the counterculture, who is Ronald Eyre's guide to the new religious concerns of people living in the San Francisco Bay area. Here religious ideas and the life styles of East and West mingle, where people brought up in a largely Chistian cultural climate look East to Taoism and Hinduism for inspiration in daily living.

"Continuum" Special Theory of Relativity," NFB of Canada, 1981.

This film weds unrelenting scientific accuracy with exciting visual effects used to explain rather than embellish. Because of its use of special effects and animation, the non-major and introductory student will come away from "Continuum" with a bedrock understanding of Einstein's ideas that would be far more difficult and time-consuming to attain in any other way.

"Darwin and Evolution," McGraw-Hill,

The life and work of Charles Darwin, from his student days to his full maturity as a great scientist. Gives insight into the theory of evolution and of science itself.

"Paul's Case," The American Short Story Series, Perspective's 1980.

Willa Cather portrays an exceptionally sensitive young man who is consumed with vague ideas of a higher life while he lives in a world absolutely at odds with that vision. As the discrepancy between Paul's dreams and reality grows wider, and his alienation becomes more intense, Paul tries to escape.

"Rappaccini's Daughter", The American Short Story Series, Perspective, 1980.

Hawthorne's "Romance", set in Italy a long time ago, is the story of a young man's entanglement with a strangely beautiful yet forbidden young woman.

"The Futurists", McGraw-Hill, 1968

Zoologist, Sir Peter Brian Medawar; architect-engineer, R. Buckminster Fuller; sociology, Danier Bell; science editor, Walter Sullivan; economist, de Jouvenel, and physicist-inventor, Dennis Gabor are interviewed and give their opinions on what they think the world of tomorrow will be like.

"The Majestic Clockwork" Ascent of Man Series 7, Time-Life, 1974.

In the evolution of physics, the contributions of Newton and Einstein occupy center stage. This film explores the revolution that ensued when Einstein's theory of relativity upset Newton's elegant description of the universe.

"The Odyssey: Central Themes" EBEC, 1965.

Highlights the fact that the three diverging themes pervading the "Odyssey" are based on a central moral truth: even against terrible odds, intelligence will win if it is combined with bravery and determination. Heroism demands both bravery and brains.

"The Starry Messenger", Ascent of Man Series 6, Time-Life 1974.

Here is the story of man's early attempts to map the forces which move the planets. Dr. Bronowski traces the origins of the scientific revolution through the conflict between fact and religious dogma, culminating in the trial of Galileo.

"World Within World" Ascent of Man 10, Time-Life 1974.

Commencing with a visit to an ancient Polish salt mine, Dr. Bronowski looks at the world inside the atom. He traces the history of man and ideas that have made 20th century physics "the greatest achievement of the human imagination".

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